WHAT IS CLAIMED IS:

1. An image processing apparatus for use in a display system having a display device, comprising:

a display input processor (DIP) configured to receive input images, reconstruct said input images, and responsively generate DIP outputs;

a display output processor (DOP) configured to process said DIP outputs, and to responsively generate DOP outputs; and

a buffer memory configured to store said DIP outputs and said DOP outputs, said buffer memory providing display images based on said DOP outputs to said display device;

whereby said image processing apparatus effectively enhances said input images to produce said display images.

2. The image processing apparatus of claim 1 wherein said DOP comprises a display map memory including display system manufacturing information, system configuration information, and user data for said display system.

3. The image processing apparatus of claim 2 wherein said system configuration information includes intensity values which can be adjusted during setup of said display system for color components of said DOP outputs.

4. The image processing apparatus of claim 1 wherein said DOP comprises a geometric transformation module for geometrically transforming said image data.



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5. The image processing apparatus of claim 4 wherein said geometric transformation module comprises:

a spatial transformation module for redefining spatial relationships between image pixels;

an alignment and rotation correction module for repositioning image pixels;

a focus correction module for correcting image defocus; and

a distortion correction module for correcting image distortions.

6. The image processing apparatus of claim 5 wherein said alignment and rotation correction module can rotate images.

7. The image processing apparatus of claim 5 wherein said focus correction module corrects said image defocus resulting from image deformation and from display optics.

8. The image processing apparatus of claim 4 wherein said geometric transformation module improves skew, tangential symmetry, aspect angle, and scale-related distortions of said display images.

9. The image processing apparatus of claim 4 wherein said geometric transformation module corrects environment-introduced image artifacts.

10. The image processing apparatus of claim 4 wherein said geometric transformation module corrects artifacts resulting from non-uniformity of the display projection path or display screen.

11. The image processing apparatus of claim 4 wherein said DOP uses a mathematical formula for altering said image data written to the display modulator to suit a panoramic projection.

12. The image processing apparatus of claim 4 wherein said geometric transformation module comprises a texture mapping module for performing texture mapping.

13. The texture mapping module of claim 12, where the texture mapping is used to perform transitions for multi-picture displays.

14. The image processing apparatus of claim 4 wherein said geometric transformation module comprises a multi-frame correlation module for performing motion-compensated frame rate conversion.

15. The image processing apparatus of claim 14 wherein motion compensation information for performing said frame rate conversion is selected from a group including a selected display image and a motion estimator output.

16. The image processing apparatus of claim 4 wherein said geometric transformation module comprises a spatial transformation module for redefining spatial relationships between image pixels.

17. The image processing apparatus of claim 16 wherein said spatial transformation module uses frame information and motion tracking information from multiple input images to increase resolutions of images.

18. The image processing apparatus of claim 17 wherein said motion tracking information is selected from a group including a compressed bitstream and a motion estimator output.

19. The image processing apparatus of claim 1 wherein said image processing apparatus receives a coded bitstream including image object information, image object depths, and image motion tracking information.

20. The image processing apparatus of claim 19 wherein and said image object information, said image object depths, and said image motion tracking information is used to provide projection means for 3D and panoramic displays.

21. The image processing apparatus of claim 19 wherein said image processing apparatus uses said object information to reposition objects in output coordinates of a panoramic display.

22. The image processing apparatus of claim 19 wherein said image processing apparatus stores the modified images to a film recorder instead of a projection system.

23. The image processing apparatus of claim 19 wherein said image processing apparatus receives a coded input that represents two images and said two images are used to present a 3D stereoscopic image.

24. The image processing apparatus of claim 1 wherein said image processing apparatus simultaneously receives multiple video streams and presents said multiple video streams in a single display using Picture-in-Picture and windowing controls.

25. The image processing apparatus of claim 24 wherein said geometric transform module performs transition effects between different video streams including fades, blends, wipes and warps.

26. The image processing apparatus of claim 1 wherein said DIP comprises an Image Reconstruction module for performing multiframe reconstruction to increase image resolutions.

27. The image processing apparatus of claim 26, wherein said multiframe reconstruction uses motion estimation vectors from an input bitstream to correlate multiple images.

28. The image processing apparatus of claim 27 wherein said motion estimation vectors are utilized or masked based on matching accuracy of motion estimation blocks associated with said motion estimation vectors.

29. The image processing apparatus of claim 28 wherein said motion estimation vectors, when utilized, are further processed to discern sub-block motion estimation.

30. The image processing apparatus of claim 26 wherein said Image Reconstruction module includes motion estimation for tracking motion between said input images and providing motion tracking results through motion estimation vectors.

31. The image processing apparatus of claim 26 wherein multiple images from multiple cameras are used to perform image reconstruction.

32. The image processing apparatus of claim 27, wherein said motion estimation vectors use enhanced matching techniques including rotation, scale and sheer techniques.

33. An image processing apparatus for use in a display system, comprising:

a display device, coupled to said display system, for viewing image data; and

a geometric transformation module coupled to said display system, said geometric transformation module being configured to precondition said image data with geometric transformations to thereby compensate for characteristics of said display system.

34. The image processing apparatus of claim 33 wherein said geometric transformation module comprises a spatial transformation module for redefining spatial relationships between image pixels.

35. The image processing apparatus of claim 33 wherein said geometric transformation module comprises an alignment and rotation correction module for repositioning image pixels.

36. The image processing apparatus of claim 33 wherein said geometric transformation module comprises a focus correction module for correcting image defocus.

37. The image processing apparatus of claim 33 wherein said geometric transformation module comprises a distortion correction module for correcting image distortions.

38. The image processing apparatus of claim 33 wherein said geometric transformation module comprises a multi-frame correlation module for performing motion-compensated frame rate conversion.

39. The image processing apparatus of claim 33 wherein said geometric transformation module improves skew, tangential symmetry, aspect angle, and scale-related distortions of said image data.

40. A method for processing images and improving image display quality for use in a display system having a display device, comprising the steps of:

using a display input processor (DIP) for receiving input images, reconstructing said input images, and responsively generating DIP outputs;

using a display output processor (DOP) for processing said DIP outputs, and for responsively generating DOP outputs; and

using a buffer memory for storing said DIP outputs and said DOP outputs, said buffer memory providing display images based on said DOP outputs to said display device.

41. The method of claim 40 wherein said DOP comprises a geometric transformation module configured to precondition said display images with geometric transformations to thereby compensate for characteristics of said display system.

42. The method of claim 41 wherein said geometric transformation module comprises a spatial transformation module for redefining spatial relationships between image pixels.

43. The method of claim 41 wherein said geometric transformation module comprises an alignment and rotation correction module for repositioning image pixels.

44. The method of claim 41 wherein said geometric transformation module comprises a focus correction module for correcting image defocus.

45. The method of claim 41 wherein said geometric transformation module comprises a distortion correction module for correcting image distortions.

46. The method of claim 41 wherein said geometric transformation module comprises a multi-frame correlation module for performing motion-compensated frame rate conversion.

47. The method of claim 41 wherein said geometric transformation module improves skew, tangential symmetry, aspect angle, and scale-related distortions of said image data.

48. A computer-readable medium storing instructions for causing a display system having a display device to perform image processing, by performing the steps of:

using a display input processor (DIP) for receiving input images, reconstructing said input images, and responsively generating DIP outputs;

using a display output processor (DOP) for processing said DIP outputs, and for responsively generating DOP outputs; and

using a buffer memory for storing said DIP outputs and said DOP outputs, said buffer memory providing display images based on said DOP outputs to said display device.

49. An image processing module that enhances input images for use in a display system having a display device, comprising:

means for receiving input images, reconstructing said input images, and responsively generating DIP outputs;

means for processing said DIP outputs to responsively generate DOP outputs; and

means for storing said DIP outputs and said DOP outputs, said means for storing providing display images based on said DOP outputs to said display device.

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